

WHAT IS CLAIMED IS:

5

1. A photo amplifying apparatus for amplifying wavelength division multiplexed signals, comprising:

10 a specific wavelength measuring unit that measures the light power of photo signals of a specific wavelength at a measuring point;

a total power measuring unit that measures the light power of said photo signals of all wavelengths at said measuring point; and

15 an output control unit that controls the output of said photo amplifying apparatus based on the light power measured by said specific wavelength measuring unit and the light power measured by said total power measuring unit.

20

2. The photo amplifying apparatus as
25 claimed in claim 1, wherein said specific wavelength measuring unit further comprises a variable-wavelength optical filter.

30

3. The photo amplifying apparatus as claimed in claim 1, wherein

35 said measuring point is positioned at one of an input stage, an intermediate stage, and an output stage; and

said output control unit, when the light

power measured by said specific wavelength measuring unit does not change and the light power measured by said total power measuring unit changes, determines the number of multiplexed wavelengths of said photo
5 signals based on the light power measured by said specific wavelength measuring unit and the light power measured by said total power measuring unit.

10

4. The photo amplifying apparatus as claimed in claim 1, wherein said output control unit, when change in the light power measured by said
15 specific wavelength measuring unit is equal to change in the light power measured by said total power measuring unit, controls the output of said photo amplifying apparatus based on the light power measured by said specific wavelength measuring unit
20 and the light power measured by said total power measuring unit so as to compensate for the loss of photo transmission path.

25

5. The photo amplifying apparatus as claimed in claim 1, wherein
said measuring point is positioned at an
30 output stage; and
said output control unit controls the output of said photo amplifying apparatus based on the number of multiplexed wavelengths, the light power measured by said specific wavelength measuring
35 unit, and the light power measured by said total power measuring unit so as to compensate a gain gradient of output photo signals.

6. A method by a photo amplifying apparatus of determining change in the number of multiplexed wavelengths in received wavelength division multiplexed signals, wherein a measuring point is provided in one of an input stage, an intermediate stage, and an output stage, comprising the steps of:

measuring the light power of a specific wavelength at said measuring point;
10 measuring the light power of all wavelengths at said measuring point; and
determining, when the measured light power of said specific wavelength does not change, and the measured light power of all wavelengths changes,
15 change in the number of multiplexed wavelengths based on the measured light power of said specific wavelength and the measured light power of all wavelengths.

20

7. A method by a photo amplifying apparatus of determining change in the signal level of wavelength division multiplexed signals, comprising the steps of:

measuring the light power of a specific wavelength at a measuring point provided in said photo amplifying apparatus;
30 measuring the light power of all wavelengths at said measuring point; and
determining, when change in the measured light power of said specific wavelength is equal to change in the measured light power of all
35 wavelengths, change in the signal level of wavelength division multiplexed signals transmitted through a photo transmission path based on said

change in the measured light power of said specific wavelength or said change in the measured light power of all wavelengths.

5

8. A method by a photo amplifying apparatus of processing wavelength division multiplexed signals in which a plurality of wavelengths are multiplexed, comprising the steps of:

receiving said signals from an exterior source;

15 measuring the light power of a specific wavelength at a measuring point provided in said photo amplifying apparatus;

measuring the light power of all wavelengths at said measuring point;

20 determining, when change in the measured light power of said specific wavelength is equal to change in the measured light power of all wavelengths, change in the signal level of wavelength division multiplexed signals transmitted through a photo transmission path based on said change in the measured light power of said specific wavelength or said change in the measured light power of all wavelengths; and

30 determining, when the measured light power of said specific wavelength does not change, and the measured light power of all wavelengths changes, change in the number of multiplexed wavelengths based on the measured light power of said specific wavelength and the measured light power of all wavelengths.

35